

## Environmental Protection Agency

## § 1037.520

### § 1037.510 Duty-cycle exhaust testing.

This section applies where exhaust emission testing is required, such as when applying the provisions of § 1037.615. Note that for most vehicles, testing under this section is not required.

(a) Where applicable, measure emissions by testing the vehicle on a chassis dynamometer with the applicable test cycles. Each test cycle consists of a series of speed commands over time: variable speeds for the transient test and constant speeds for the cruise

tests. None of these cycles include vehicle starting or warmup; each test cycle begins with a running, warmed-up vehicle. Start sampling emissions at the start of each cycle. The transient cycle is specified in appendix I to this part. For the 55 mph and 65 mph cruise cycles, sample emissions for 300 second cycles with constant vehicle speeds of 55.0 mph and 65.0 mph, respectively. The tolerance around these speed set-points is  $\pm 1.0$  mph.

(b) Calculate the official emission result from the following equation:

$$\text{Emissions} \left( \frac{g}{\text{ton-mile}} \right) = \frac{1}{\text{payload (tons)}} \cdot \left( \frac{w_{\text{transient}} \cdot m_{\text{transient}}}{D_{\text{transient}}} + \frac{w_{55} \cdot m_{55}}{D_{55}} + \frac{w_{65} \cdot m_{65}}{D_{65}} \right)$$

Where:

*payload* = the standard payload, in tons, as specified in § 1037.705.

*w* = weighting factor for the appropriate test cycle, as described in paragraph (c) of this section.

*m* = grams of CO<sub>2</sub> emitted over the appropriate test cycle.

*D* = miles driven over the appropriate test cycle.

(c) Apply weighting factors specific to each type of vehicle and for each duty cycle as described in the following table:

TABLE 1 TO § 1037.510—WEIGHTING FACTORS FOR DUTY CYCLES

	Transient (%)	55 mph cruise (%)	65 mph cruise (%)
Vocational .....	42	21	37
Vocational Hybrid Vehicles .....	75	9	16
Day Cabs .....	19	17	64
Sleeper Cabs .....	5	9	86

(d) For transient testing, compare actual second-by-second vehicle speed with the speed specified in the test cycle and ensure any differences are consistent with the criteria as specified in 40 CFR part 1066. If the speeds do not conform to these criteria, the test is not valid and must be repeated.

(e) Run test cycles as specified in 40 CFR part 86. For cruise cycle testing of vehicles equipped with cruise control, use the vehicle's cruise control to control the vehicle speed. For vehicles equipped with adjustable VSLs, test the vehicle with the VSL at its highest setting.

(f) Test the vehicle using its adjusted loaded vehicle weight, unless we determine this would be unrepresentative of

in-use operation as specified in 40 CFR 1065.10(c)(1).

(g) For hybrid vehicles, correct for the net energy change of the energy storage device as described in 40 CFR 1066.501.

### § 1037.520 Modeling CO<sub>2</sub> emissions to show compliance.

This section describes how to use the GEM simulation tool (incorporated by reference in § 1037.810) to show compliance with the CO<sub>2</sub> standards of §§ 1037.105 and 1037.106. Use good engineering judgment when demonstrating compliance using the GEM.

(a) *General modeling provisions.* To run the GEM, enter all applicable inputs as specified by the model. All seven of the